



preserve it right

# Canning and freezing tomatoes

Stocking a cupboard or freezer with home-preserved tomatoes can be a satisfying experience, if you have the time and necessary equipment.

## Safety Concerns

Improperly canned tomatoes have caused some cases of botulism poisoning in recent years. Botulism comes from dangerous toxins that are produced when *Clostridium botulinum* spores grow in low acid foods. These factors affect the acidity and therefore the safety of tomatoes for home canning:

**Tomato selection.** Tomato cultivars (variety) vary in acidity. Growing conditions, climate and location also affect acidity. Overripe and infected tomatoes may be low enough in acid to support *Clostridium botulinum*. Use only firm, ripe tomatoes that have no spoiled parts or mold. Tomatoes harvested from dead vines are low in acid. They can be eaten fresh or frozen, but do not can tomatoes from dead vines.

**Processing method.** The “open-kettle” method is unsafe because undesirable organisms could grow and lower the acidity enough to allow production of botulism toxin. Use only the times and methods indicated in this bulletin or other publications based on the 1988 USDA guidelines.

**Altitude.** As altitude increases, water boils at a lower temperature (less than 212° F). Because lower temperatures are less effective for killing bacteria, either the process-

ing time or the pressure must be increased as altitude increases. Follow the altitude adjustments in Tables 1 and 2. Refer to the map on page 4 to check your county altitude.

**Added ingredients.** Do not add any ingredients beyond those given in the directions. Adding other vegetables can lower the acidity and change the processing time.

To can spaghetti sauce or other tomato mixtures, use tested recipes such as those found in *Complete Guide to Home Canning*, AB 539, available at <http://extension.usu.edu/publica/foodpubs.htm> or call ISU Extension’s Answer Line (see page 4) or your county extension office.

**Follow instructions.** Read through all directions before beginning to can or freeze foods. If using a pressure canner, make sure it is in good working order; have the gauge checked for accuracy.

## How to can tomatoes

**1. Choose standard jars and lids.** Check jars and lids for cracks, chips, dents, and rust; these defects cause sealing failures. Commercial jars such as those used for mayonnaise are not recommended for home canning because they are not designed for use with two-piece lids and because the glass is more likely to break during processing. Wash jars in hot, soapy water; rinse well. Prepare lids and

bands according to manufacturer’s directions. Mineral deposits or hard water film on jars can be removed by soaking the empty jars for several hours in a solution of 1 cup vinegar per gallon of water. To avoid mineral deposits on jars during processing, add ¼ cup vinegar per gallon of water used in the boiling water bath canner or the pressure canner.

## 2. Select tomatoes.

Always use fresh, firm, ripe tomatoes, allowing 2½ to 3½ pounds of fresh tomatoes for one quart of canned tomatoes. Wash tomatoes. Dip in boiling water for 30 to 60 seconds or until skins split then dip quickly in cold water. Cut out stem end and peel tomatoes. Be sure to remove all blemishes and cores. Skins must be removed to reduce the bacterial load and allow for uniform heat penetration. Leave tomatoes whole or cut in half.

## 3. Acidify tomatoes.

To ensure safe acidity in whole, crushed, or juiced tomatoes, you must add bottled lemon juice or food grade citric acid to each jar before processing. For quarts, use 2 tablespoons lemon juice or ½ teaspoon citric acid per quart. For pints use 1 tablespoon bottled lemon juice or ¼ teaspoon citric acid. Food grade citric acid is available at some food stores or drug stores. Do not substitute ascorbic acid for citric acid. If the canned tomatoes are too tart for your taste, add a little sugar or sweetener before serving. Four tablespoons vinegar (5% acidity)

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per quart can be used instead of lemon juice or citric acid but may cause undesirable changes in flavor.

#### 4. Salt tomatoes, if desired.

Salt is not necessary for preservation in canned products but can be added for flavor. Use ½ teaspoon per pint or 1 teaspoon per quart.

#### 5. Pack tomatoes.

Tomatoes can be packed hot or raw, in different forms (whole, halved, or crushed) and in different mediums (water, tomato juice, or without added liquid). The more solids in the mixture, the longer the processing time. For instance, tomatoes in juice or without added liquid require 85 minutes in a boiling water canner because the mixture has more solids and is more dense than if packed in water.

*Whole or halved tomatoes in liquid: hot pack.*

Place prepared whole or halved tomatoes in kettle; add enough water to prevent scorching. Heat to boiling; boil gently for 5 minutes, stirring to prevent sticking. Measure bottled lemon juice or citric acid into the jars; add salt if desired. Fill jars with hot tomatoes

and hot liquid (water or tomato juice) leaving ½ inch headspace. Wipe jar rims and adjust lids.

*Whole or halved tomatoes in liquid: raw pack.*

Measure bottled lemon juice or citric acid into the jars; add salt if desired. Fill jars with prepared whole or halved tomatoes. Add boiling liquid (water or tomato juice) leaving ½ inch headspace. Wipe jar rims and adjust lids.

*Whole or halved tomatoes without added liquid: raw pack.*

Measure bottled lemon juice or citric acid into jars; add salt if desired. Fill jars with raw, peeled whole or halved tomatoes. Press tomatoes in jars until spaces fill with juice, leaving ½ inch headspace. Wipe jar rims and adjust lids.

*Crushed tomatoes without added liquid: hot pack.*

Peel and quarter tomatoes and place in a pan. Heat quickly, stirring to prevent sticking. Boil 5 minutes. Measure bottled lemon juice or citric acid into the jars; add salt if desired. Fill jars with hot tomatoes leaving ½ inch headspace. Wipe jar rims and adjust lids.

*Tomato juice.*

Use ripe, juicy tomatoes. Wash, remove stem ends, cut tomatoes into pieces. Simmer until softened, stirring often. Put through strainer. Reheat at once just to boiling. Measure bottled lemon juice or citric acid into the jars; add salt if desired. Fill jars with boiling hot juice, leaving ½ inch headspace. Wipe jar rims and adjust lids.

#### 6. Process tomatoes.

*To process in a boiling water canner:*

Fill canner halfway with water and preheat to 180°F for hot pack or 140°F for raw pack. Load sealed jars into canner. Be sure water can circulate freely around each jar. Add boiling water to a level of one to two inches above the jars. Bring water in canner to a vigorous boil, adjust heat to maintain a gentle boil and cover. Process for the time recommended in Table 1. Do not reduce the processing time. Keep water boiling (212°F) during the entire processing period. If water evaporates, add boiling water to keep it at least one inch over the top of jars. Leave the lid on the canner. Remove jars when the processing time is up.

**Table 1. Recommended Processing Times in a Boiling Water Canner**

Product	Style Pack	Jar size	Minutes of processing at altitudes of	
			0-1,000 ft	1,001-3,000 ft
Whole or halved tomatoes packed in water	Hot or	Pints	40	45
	Raw	Quarts	45	50
Whole or halved tomatoes packed in juice	Hot or	Pints	85	90
	Raw	Quarts	85	90
Whole or halved tomatoes without added liquid	Raw	Pints	85	90
		Quarts	85	90
Crushed tomatoes without added liquid	Hot	Pints	35	40
		Quarts	45	50
Tomato juice	Hot	Pints	35	40
		Quarts	40	45

*To process in a pressure canner:* Place jar rack, 2 inches of water, and sealed jars in canner. Fasten lid. Heat on high. After steam exhausts for 10 minutes, add weighted gauge or close petcock. Allow canner to reach designated pressure. Start timing when designated pressure is reached. Regulate heat to maintain a uniform pressure. Process for the time recommended in Table 2. Do not reduce the processing time. When processing is complete, remove canner from the burner. Let canner cool at room temperature until it is fully depressurized. Allow 30 to 60 minutes depending

on canner size. Do not rush the cooling by setting canner in water or by running cold water over canner. Never attempt to hasten pressure reduction by lifting the weight or opening the vent. Carefully open the petcock or remove the weighted gauge. Wait 2 minutes, then slowly release and remove the canner lid.

**7. Remove and store jars.**

Take jars from canner and set upright on a rack or on a folded cloth away from drafts. Do not tighten lids. Allow jars to cool undisturbed for 12 to 24 hours, then check for sealing failures.

To test jar, press center of lid. If lid is down and will not move, jar is sealed. Remove screw bands carefully. Wash, dry, label and store jars in a cool, dark place. If any jars have not sealed, place in refrigerator and use within 2 days. Or, repeat the entire canning procedure with clean jars and new lids; quality will be affected. Tomato products are safe as long as lids remain sealed. Never use tomatoes or tomato juice that shows evidence of mold. Mold raises the pH of the contents so that the deadly botulism toxin could develop.

**Table 2. Recommended Processing Times in a Pressure Canner**

Product	Style pack	Jar size	Minutes of processing time	Dial gauge	Weighted gauge	
				Canner gauge pressure at altitudes of 0-2,000 ft (pounds)	0-1,000 ft (pounds)	Over 1,000 ft (pounds)
Whole or halved tomatoes packed in water	Hot or Raw	Pints or Quarts	10	11	10	15
Whole or halved tomatoes packed in juice	Hot or Raw	Pints or Quarts	25	11	10	15
Whole or halved tomatoes without added liquid	Raw	Pints or Quarts	25	11	10	15
Crushed tomatoes without added liquid	Hot	Pints or Quarts	15	11	10	15
Tomato juice	Hot	Pints or Quarts	15	11	10	15

**How to freeze tomatoes**

**Whole or cut up tomatoes**

Wash and peel tomatoes. Leave whole or cut in halves or pieces. Pack into freezer containers leaving 1 inch headspace. Seal, label, and freeze.

**Tomato juice**

Wash, sort and trim firm, vine-ripened tomatoes. Cut in quarters or eighths. Simmer 5 minutes. Press through a sieve. If desired, add 1 teaspoon salt to each quart

of juice; salt does not affect keeping quality. Pour into freezer containers leaving 1 inch headspace. Seal, label, and freeze.

**Stewed tomatoes**

Remove stem ends, peel and quarter ripe tomatoes. Cover and cook until tender, 10 to 20 minutes. Cool by placing pan containing tomatoes in cold water. Pack into freezer containers, leaving 1 inch headspace. Seal, label, and freeze.

**Questions and answers**

*When I opened a jar of home-canned tomatoes I saw black spots on the underside of the metal lid; does that mean they're spoiled?*

Natural compounds in some foods cause a black or brown deposit on the underside of the lid. This deposit does not mean the food is unsafe to eat. However, whenever a sealed jar comes open, spoilage is likely and the product should be discarded.

*My home-canned tomatoes look cloudy. Are they safe to eat?*  
 Cloudy liquids in home-canned foods can mean the product was improperly processed and has spoiled. Check for other signs of spoilage and discard if necessary. The minerals in hard water and the fillers in table salt also can produce a cloudy liquid. To prevent cloudiness, use soft water and a pure, refined canning salt.

*My jars of home-canned tomatoes always have less liquid after processing. Is that okay, or how can I avoid it?*  
 Never open sealed jars to replace liquid lost during processing. Food may darken but is safe to eat if the seal has not broken. To avoid the problem, heat the food before packing into jars, pack the food loosely, be sure to leave the recommended headspace, and remove air bubbles before sealing by running a rubber bottle scraper between food and jar. If using a pressure canner, keep the heat constant during processing so the pressure does not fluctuate. After processing, allow the pressure to drop naturally.

*My jars seal, but the home-canned tomatoes come open before I have a chance to use them. What should I do?*  
 Spoilage has probably occurred; discard the food. Next time, be sure to process for recommended time, wipe jar rims to help get good seal, and do not use jars with chips or cracks.

*Last time I canned tomatoes, some of the jars didn't seal. What can I do to make sure all the jars seal this time?*  
 Here's how to prevent the six most common causes of sealing failure.

1. Use standard canning jars and lids; follow instructions carefully.
2. Purchase new lids each year. The sealing compound may become defective during extended storage. Never re-use lids.
3. Make sure you have a supply of good jars and lids before starting to can. Avoid using jars that are chipped or lids that are bent.
4. Leave the recommended headspace when filling jars so that food is not forced between the jar and lid during processing. If using a pressure canner, do not let the pressure fluctuate during processing,

and allow the pressure to drop to zero naturally after processing.

5. Carefully wipe off jar rim and threads before putting on the lid and band to prevent dripped food particles from causing a sealing failure.
6. After processing, let the jars cool undisturbed. Do not tighten the screw band after removing jar from canner.

*What can I do to avoid jars breaking in the canner?*  
 Use only standard canning jars and check them carefully for hairline cracks before starting to prepare food for canning. Handle jars carefully when transferring them in or out of the canner. Use a rack in the bottom of the canner and add the recommended amount of water. Don't overtighten the screw bands; when trapped air can't escape during processing, the jar is likely to break.

**For more information**

For more information on food preservation call your county extension office or Answer Line 1-800-262-3804 (voice) or 1-800-854-1658 (telecommunications device for deaf).

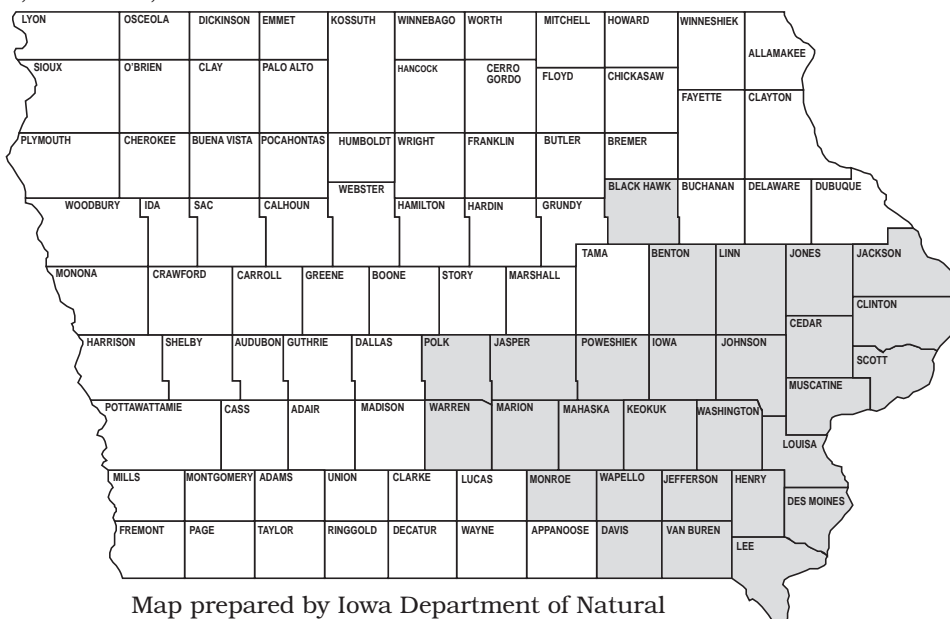
Or check The Penn State Preservation Database World Wide Web Site: <http://www.foodsafety.cas.psu.edu/presqueryform.htm>

ISU Extension fact sheets are available at <http://www.extension.iastate/Pages/pubs>

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**Altitudes of Iowa Counties**

Shaded areas are less than 1,000 feet; unshaded areas are 1,000 to 2,000 feet.



Map prepared by Iowa Department of Natural Resources, Geological Survey Bureau